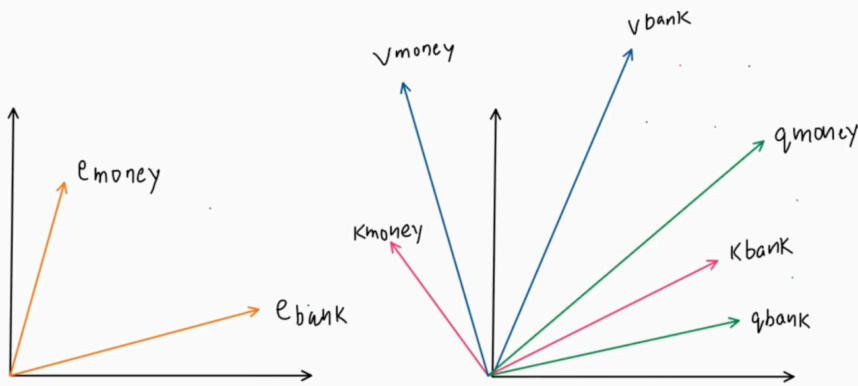


Self Attention Geometric Intuition.

Geometric Intuition

08 March 2024 15:16



money bank

e_{money}

e_{bank}

w_q

w_k

w_v

q_{money}

q_{bank}

k_{money}

k_{bank}

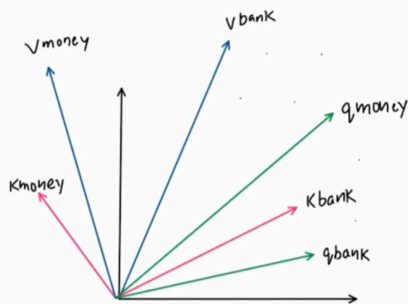
v_{money}

v_{bank}

$$w_q = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} \quad w_k = \begin{bmatrix} 3 & 4 \\ 5 & 1 \end{bmatrix} \quad w_v = \begin{bmatrix} 4 & 1 \\ 2 & 1 \end{bmatrix}$$

* All values are hypothetical

whenever we do a dot product of a vector with the matrix, there is a linear transformation.



[Dot Product]

$$s_{21} = 10$$

$$s_{22} = 32$$

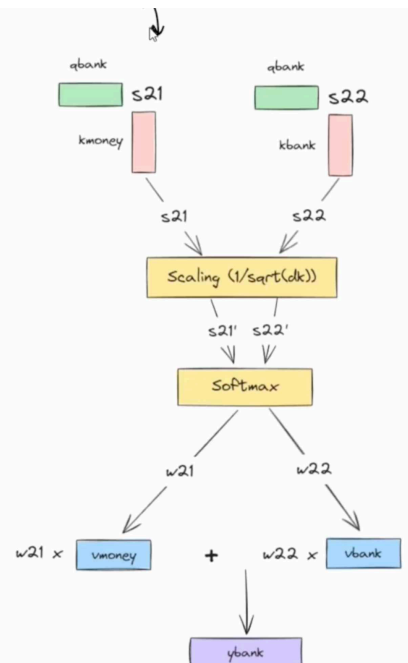
[Scaling]

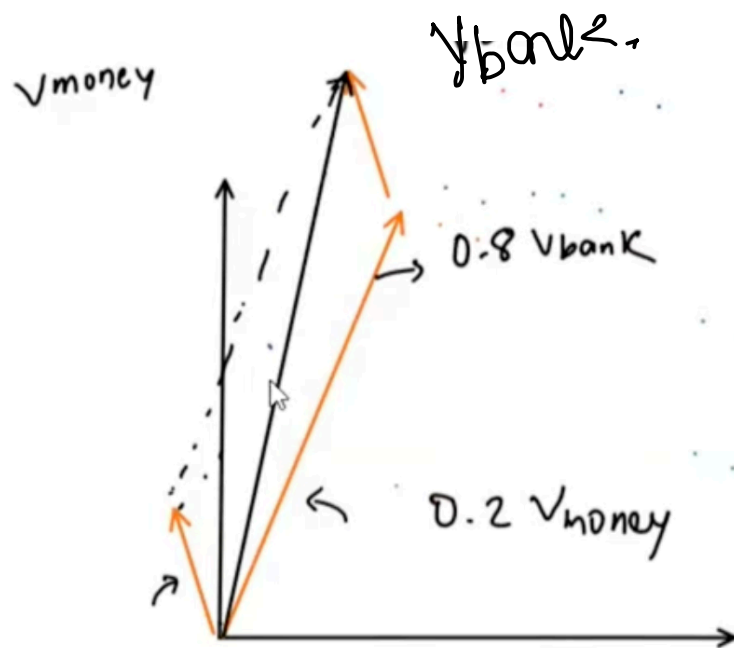
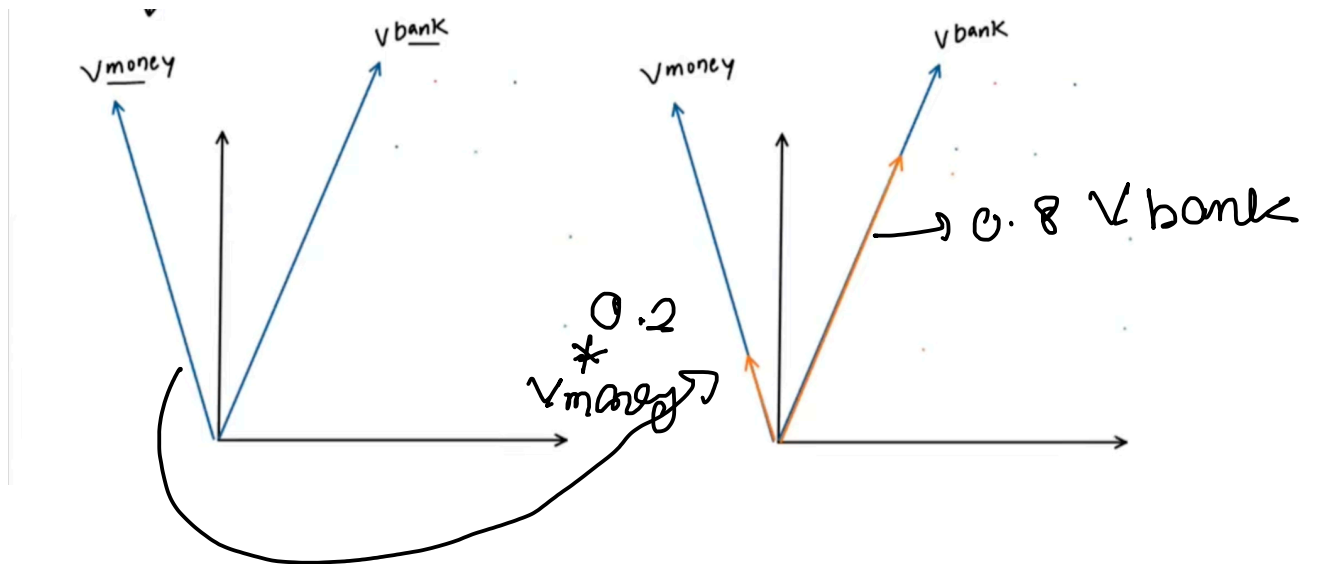
$$s'_{21} = \frac{10}{\sqrt{2}} = 7.09 \quad s'_{22} = \frac{32}{\sqrt{2}} = 22.69$$

[Softmax]

$$w_{21} = 0.2$$

$$w_{22} = 0.8$$





\therefore v_{bank} and e_{bank} is different.